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GEOLOGIC APPLICATION

OF THERMAL INERTIA IMAGING

USING HCMM DATA

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Introduction

The JPL/HCMM Investigation is a study of the feasibility of using thermal inertia, inferred from remotely sensed temperature data, to complement Landsat reflectivity data for reconnaissance geologic mapping and mineral exploration. During the April-June 1979 quarter of this investigation U-2 aircraft day-night overflights with the Daedalus 11-channel scanner were obtained over the Death Valley, California test site. These were timed to coincide with a set of day-night overpasses of the same area by HCMM. Construction of a device to measure thermal inertia in situ was completed and laboratory testing and calibration begun.

Problems

To date, only one set of satellite daytime data tapes has been received. A few HCMM satellite images have been received but generally not of our test sites or at the priority times requested. This lack of data continues to be the major problem in this investigation.

Accomplishments

On April 4, 1979 Daedalus 11-channel scanner data were obtained during a set of day-night overflights of the Death Valley, California test site with the NASA/Ames U-2. These flights were coordinated to coincide with the April 4, 1979 day-night HCMM overpasses. The efforts of all concerned to obtain the HCMM nighttime data are greatly appreciated.

Construction of the Thermal Inertia Meter (TIM) was completed during this quarter and laboratory testing and calibration was begun. Standard Ottawa sand and dolomite were acquired and their thermal properties determined. These two standards of known thermal inertia will be simultaneously and equally heated along with the ground surface by the TIM. The ratio of the heating history of either of the standards to the heating history of the ground surface can be directly related to the ratio of the thermal inertia

of the standards to calculate the thermal inertia of the ground surface.

Significant Results

None

Presentations

None

Program for next reporting interval

After completion of laboratory testing and calibration of the TIM, a detailed field sampling program will be initiated at the Goldfield, Death Valley and Pisgah Crater test sites. Analysis of newly or previously obtained aircraft and ground-truth data will continue and processing of HCMM data tapes will begin immediately upon their receipt.

Recommendations

The lack of HCMM satellite data tapes remains the major obstacle in this investigation. It is imperative that NASA take immediate action to facilitate the dissemination of these data.

Funds Expended

Expenditures for April-June, 1979: \$12,018

Conclusions

None